



**MONTANA DEPARTMENT OF REVENUE**

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The Department of Revenue prepared this manual to aid department staff in understanding the implementation and assessment of private forestland in Montana. The information is organized into the following pages:

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# Overview

Taxing jurisdictions throughout the United States have historically used numerous methods to generate tax revenues from standing timber or the land on which these trees grow. In the pacific coast and intermountain region, five states assess forestland or the timber harvested from those lands. They are:

- California
- Idaho
- Montana
- Oregon
- Washington

There are four distinct forest taxes utilized in these states. They are:

- Yield Tax
- Severance Tax
- Site Value
- Productivity Tax

## **Yield Tax:**

The yield tax is a tax on the value of harvested timber.

A specific tax rate is applied to the harvested value.

The tax is not collected until the timber is harvested.

Factors that influence tax revenues are:

- Volume of timber harvested
- Value of timber harvested
- Yield tax rate on the value

## **Severance Tax:**

The severance tax is a flat tax on a specific unit of volume harvested, such as board feet, cubic feet or tonnage. A tax rate is applied to the harvested volume. The tax is not collected until the timber is harvested. Factors that influence tax revenues for this tax are:

- Volume of timber harvested
- Severance tax rate on the volume

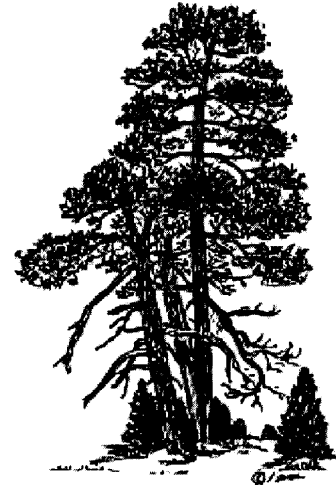
## **Site Value Tax:**

The site value tax is an annual tax on the bare land under the timber. The tax insures a steady, but generally small stream of revenues to local governments that rely on yield and severance taxes (harvest taxes).

The land value is made without consideration of the standing timber value. In many respects, the site value tax is similar to the productivity tax. The land is classified into site classes according to soil productivity. A value is then assigned to each site class. In this region of the country, politics and the court systems have mandated valuation procedures that have no correlation to present net worth principals.

Factors that influence tax revenues are:

- Appraised value
- Property class taxable percentage (if applicable)
- Local taxing jurisdiction mill levy



## **Productivity Tax:**

The productivity tax is a tax on the land's capability to produce timber. The tax is calculated using an income capitalization formula. This system produces an annual tax that places a heavier tax burden on more productive forest sites. Factors that influence tax revenues are:

- Appraised value
- Property class taxable percentage (if applicable)
- Local taxing jurisdiction mill levy

Yield and site-value taxes are used in all pacific coast and intermountain states, except Montana. The severance tax is also common, however the tax is regressive and states generally limit the revenues to a minor tax status<sup>1</sup>. In Montana, the Department of Natural Resources and Conservation administers the timber severance tax through their slash disposal program. The revenues are distributed to the state's forestry extension program, located at the University of Montana School of Forestry.

Montana and Idaho use a similar productivity tax system. In fact, Montana adopted Idaho's valuation formula when Montana switched to the productivity tax system. Idaho, unlike Montana, offers certain landowners the option to choose between the productivity tax and the yield tax.

All states in the Pacific and Intermountain Northwest have eliminated ad valorem taxes on forestland or standing timber occupying a forest site. Only Arizona in the western United States has an ad valorem tax on forestland.<sup>2</sup>



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<sup>1</sup> The tax is regressive because it is based on volume rather than value.

<sup>2</sup> Ueltschi, Frank. 2000. Survey of Forestland Taxation for Nonindustrial Private Owners in the United States. LSU School of Forestry, Wildlife, and Fisheries.

# *History of Forest Land Taxation in Montana*

Approximately 14.6 million acres are classified as commercial forestland in Montana.<sup>3</sup> Of this total, about 4.1 million acres are classified as private forestland, with the remaining 10.5 million acres in public ownership.

In 1957, the legislature passed a law directing the State Board of Equalization to provide for a “general and uniform method of appraising timberlands.” Prior to then, forestland assessment was inconsistent throughout the state. In 1959, the legislature provided funding for the Board of Equalization to develop a standing inventory tax system. Under this appraisal system, most of the private forestlands were classified and assessed in the early 1960’s. Elected assessors had the choice of classifying the standing timber in their county or contracting the work to the state Division of Forestry. In 1972, the new Montana state constitution created the Property Assessment Division of the Department of Revenue and eliminated the Board of Equalization. The department then took over responsibility for maintaining the standing inventory system and creating cyclical valuation schedules.

The 1991 legislature passed the “Forestlands Tax Act.” This bill eliminated the standing inventory tax system and replaced it with the forestland productivity tax. The Department was granted three years to develop and implement the new system. On January 1, 1994, the forestland productivity tax became effective. In 1997, the legislature made several minor revisions to the law at the request of the department.

Since 1972, the legislature has placed forestlands in several different property tax classes.

From 1963 to 1982	Property tax class 03
From 1982 to 1994	Property tax class 13
From 1994 to present	Property tax class 10

The legislature has also periodically adjusted the taxable percentage rate. The most recent change occurred in 1999, when legislation phased the taxable percentage down annually over the remainder of the 1997 reappraisal cycle. Although the taxable percentage rate has ranged from less than one percent to 30 percent, the average statewide taxable value per acre has remained stable since 1972.

Under current law, forestland reappraisal cycles are six years in duration. The reappraisal values are phased in at equal increments over the duration of the appraisal cycle.



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This information was received from the Montana Department of Commerce, and it is subject to change.

# Forest Land Tax Act

In 1991, the 52<sup>nd</sup> legislature passed the Forestlands Tax Act. Many physical and economic conditions for the classification system are defined, as well as the valuation formula and each component in the formula. The law also provides for forest valuation zones, with each zone designated to recognize the uniqueness of marketing areas, timber types, growth rates, access, operability and other factors important to the valuation of forestland in that geographic area. The technical design for the productivity classification was delegated to the Department of Revenue and the University of Montana School of Forestry.

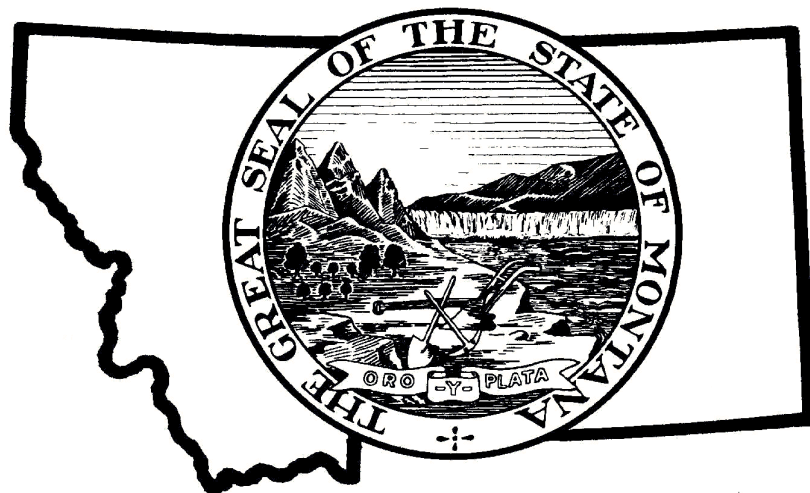
The bill is codified in 15-44-101 through 15-44-105, Montana Codes Annotated (MCA). In 1993, the department adopted administrative rules to administer this law. These rules are described in ARM. 42.20.160 through 42.20.169. In 1997, the Department added Administrative Rules Manual (ARM). 42.20.170, which contains the forest valuation schedules.

Important forestland definitions are defined in 15-44-102, MCA. Perhaps the most important definitions are found in subsection five. This section states that forestland is:

- Contiguous forestland of 15 acres or more in one ownership
- Capable of producing timber than can be harvested in commercial quantity
- Producing timber unless the trees have been removed by man through harvest, including clear-cuts or by natural disaster
- Land that produces at least 25 cubic feet per acre, per year at the culmination of mean annual increment
- Land that has not been converted to another use

Standing timber is exempt from property taxation (15-6-201 (u) MCA). Only the bareland under the timber is eligible for assessment. If a landowner deeds his timber to another party, the landowner, not the timber owner, is responsible for the forestland property tax.

The law also allows for a 50 percent reduction in the appraised value for 20 years if standing timber is destroyed by natural disasters (15-44-104, MCA). A complete discussion of the natural disaster provision is found in chapter 8, *"Forest Valuation Due to Natural Reductions."*



# *Key Statutory Laws and Administrative Rules*

## **Statutory Laws**

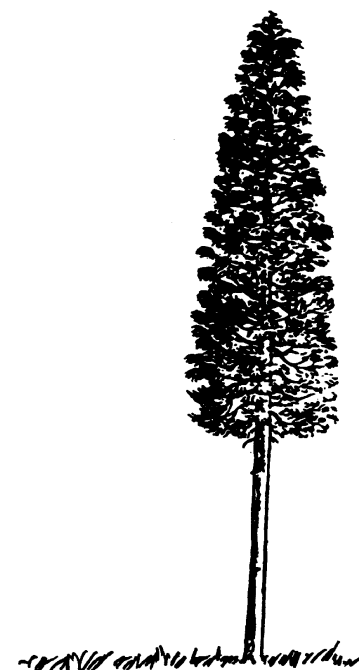
## **Short Title**

15-6-143, MCA	Class ten property – Calculation of the taxable percentage
15-6-201 (u), MCA	Property tax exemption of timber
15-7-103, MCA	General and uniform classification and appraisal
15-8-201, MCA	General assessment day
15-44-101, MCA	Forestlands tax act – short title
15-44-102, MCA	Key definitions pertaining to the forestlands tax act
15-44-103, MCA	Legislative intent pertaining to the valuation formula: income, expense and capitalization components
15-44-104, MCA	Reduction in values for forestland: trees destroyed by natural disasters such as fires, disease, insect infestation or other natural disasters

## **Administrative Rules**

## **Short Title**

42.20.135, ARM	Procedure for removing one acre beneath improvements on nonqualified agricultural land, and improvements on forestland from property land classification
42.20.160, ARM	Forestland assessment
42.20.161, ARM	Forestland classification definitions
42.20.162, ARM	Exceptions to forest land assessment
42.20.163, ARM	Forestland ownership
42.20.164, ARM	Forestland productivity classes
42.20.165, ARM	Forestland eligibility – general principles
42.20.166, ARM	Forestland valuation zones
42.20.167, ARM	Forestland valuation formula
42.20.168, ARM	Forest costs
42.20.169, ARM	Natural disaster reduction – general principles
42.20.170, ARM	Forestland valuation schedules





# Forest Productivity

Potential productivity is the basis for forestland classification in Montana. Potential means the maximum average annual growth of wood that could be expected from a natural stand of coniferous trees over a long period.<sup>4</sup> This growth is expressed in cubic feet of wood per acre per year (cf/ac/yr). A cubic foot is the volume of wood in a block 12 inches long, by 12 inches wide, by 12 inches high. Volume is measured by multiplying the tree's average cross-sectional area (basal area) by the tree's length.

The classification system measures potential, not actual, productivity. They are not synonymous. Potential productivity is constant, regardless of the standing inventory growing on the land. Potential productivity is not influenced by insects and disease, overstocking, forest fires or logging activities. Actual productivity is the actual growth that has occurred or is occurring on, and is influenced by the above mentioned activities. Actual productivity is dynamic and constantly changes.

To illustrate the difference between potential and actual productivity, look at the following examples. One stand of trees is diseased with dead and dying timber. An adjacent stand supports young, healthy trees. Their actual growth rates are quite different, but the underlying potential productivity of the land is the same. The same comparison can be made between a clear-cut and an old growth stand. Both sites can have the same underlying potential productivity, although the clear-cut does not contain standing timber and has no actual timber production.

The things that make a forest productive are long growing seasons, plenty of sunlight, rainfall and fertile soils. This potential is inherent to the land, even when trees have recently been harvested. Generally, direct measurement of potential productivity is not possible. The forestry profession deals with this problem by finding things that can be easily measured, which also are strongly related to potential productivity. Forestry researchers have collected data, then applied statistics and mathematical models to estimate potential productivity.

In conclusion, actual productivity will be equal to potential productivity, only under rare conditions. As climate, soils and topography change from place to place, so does the potential productivity.<sup>5</sup> This "potential" is the basis for the Montana forestland tax system.



<sup>4</sup> The maximum average annual growth is reduced by average annual mortality as reflected in normal yield tables.

<sup>5</sup> Milner, Kelsey S. 1995. Forest Productivity Maps For Montana Forestland. A primer on the development of the productivity maps used in the Montana Forestland Tax System. University of Montana. School of forestry. 15 pp.



# *Potential Productivity Classification System*

The classification of potential productivity on the Montana forest landscape is an integration of several technologies that represent state-of-the art capabilities in natural resource management. While it is true no one physically visited each forest property, it was visited electronically through a computer and a geographic information system (GIS). The GIS contains data on the climate, soil depth and topography for most of the state.

Productivity is predicted by using computer models to grow trees on each acre of forestland in the state, including clear-cuts. Satellite imagery and aerial photography is used to delineate forestland from non-forestland.

Ecosystem process models calculate the carbon, water and nitrogen that cycle through a forest ecosystem.<sup>5</sup> Estimates are made on hypothetical stands occurring on all possible combinations of predefined classes of slope, aspect, elevation, soil moisture holding capacity, leaf area and climate in Montana. Productivity estimates for these hypothetical stands are then attached to real acres through linkage with the GIS. This process is possible because the GIS contain topographic, edaphic (soils) and climatological information for each acre of land in the project.

Climate and photosynthesis models generate estimates of potential timber productivity for fully stocked even-aged stands. In the modeling process, Douglas fir is considered the dominant tree species in western Montana and ponderosa pine is considered the dominant species in eastern Montana. Potential productivity estimates reflect only tree stem growth. In other words, the volume contained in understory vegetation, leaves, branches and stumps are removed from the growth estimate. Productivity is also modified on low elevation sites that have problems attaining full stocking due to poor precipitation. Further modifications are made to differences in aspect.

Potential productivity is estimated in cubic feet per acre per year at the culmination of mean annual increment (CMAI). Just as individual tree volumes are estimated by measuring specific points on a tree (Example: diameter at breast height (dbh)), growth and yield estimates must be measured at specific growth points and time intervals. This allows valid and consistent comparisons between forest sites. The culmination of mean annual increment indicates the age at which mean annual growth increment of an even-age stand is greatest. The CMAI is regarded as the ideal harvest or rotation age in terms of most efficient volume production.

The accuracy of the productivity estimates depends upon two critical factors: the resolution of the GIS databases and the sensitivity of changes to model variables. The data represents averages, and any location may differ from average conditions. Forest sites have large biological diversity. For example, a forest locale may have several different soils. However, the GIS soil data layer reflects large areas with uniform soils. If this difference is large, the productivity estimate may be in error.

Based on the database resolutions and model outputs, the University researchers determined that the department's classification system is statistically valid for a productivity range of approximately 20 cu.ft./ac./yr. or larger. The use of a wide productivity range reduces the

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<sup>5</sup> Wall, Ken., Dr. Kelsey Milner, Dr. Steve Running, Dr. Hans Zurring, Dr. Hong Tu, and Dean Coble. 1991. Implementing a Large Scale GIS on a Statewide Project. The Forest Productivity Based Taxation System. University of Montana, School of Forestry. 8pp.

chances of improperly classifying productivity on any given land parcel. For example, if the true potential productivity on a parcel is 55 cu.ft./ac./yr., the productivity model may be in error by as much as 20 percent, and still place the parcel in the correct productivity class.

State law stipulates that the minimum potential productivity for commercial forestland is 25-cu.ft./ac./yr @ CMAI.<sup>6</sup> If a forested site doesn't meet this standard, the land cannot be classified as forestland for property taxation.

The upper end of estimated potential productivity range in Montana is approximately 100 cu.ft./ac./yr. @ CMAI.. This productivity range of approximately 75 cu.ft./ac./yr. produces four productivity classes.

<b>Class I (excellent productivity):</b>	<b>85+</b>	<b>cuft/acre/year</b>
<b>Class II (good productivity):</b>	<b>65-84.99</b>	<b>cuft/acre/year</b>
<b>Class III (fair productivity):</b>	<b>45-64.99</b>	<b>cuft/acre/year</b>
<b>Class IV (poor productivity):</b>	<b>25-44.99</b>	<b>cuft/acre/year</b>
<b>Noncommercial:</b>	<b>&lt;25</b>	

Advances in technology have allowed Montana to predict potential productivity not used before. Typically, other state and federal agencies estimate potential productivity with the aid of site index and normal yield tables.<sup>7</sup> Foresters have developed site indexes that are a relative measure of productivity on a forest site. Site index tables use tree height and age to determine an index figure. These tables are tree species dependent and indigenous to a specific region of the country. A site index number is applied to yield curves in a yield table to estimate potential yield for a given site. Unfortunately, most yield and site index tables were developed from data outside of Montana.

The department's productivity estimates are generally more conservative than estimates used by the Montana State Division of Forestry, Farm Services Agency (formerly the Soil Conservation Service), US. Forest Service and the Bureau of Land Management.

### **Forestland Eligibility Requirements:**

To receive forestland classification, land must meet the following criteria:

- Forested land must produce at least 25 cu.ft./ac./yr. @ CMAI.
- Forested land must be at least 15 contiguous acres or larger and at least 120 feet in width.
- The land must produce at least 25 cu.ft./ac./yr. @ CMAI.
- Multiple parcels must be contiguous and in the same ownership.
- The land cannot be dedicated to another use such as agricultural, residential, commercial or industrial.
- The land must be stocked with at least 10 percent commercial "softwood" trees species unless the trees have been removed by man through harvest, including clear-cuts, or by natural disaster.

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<sup>6</sup> This is in contrast to the federal government or the Montana Division of Forestry that designates 20 cubic feet per acre per year at CMAI, as the minimum potential productivity level for commercial forest land. From the standpoint of property taxation, if a forested site cannot meet the "25 cubic feet" growth requirement, the land is classified as nonforest land.

<sup>7</sup> Normal yield tables and productivity models are a comparative approach, which use indirect methods of estimating growth.

The land cannot be removed from timber utilization because of deed restrictions, covenants or governmental operations of law. The land cannot be incapable of producing commercial wood products because of adverse site conditions or physical inaccessibility.

### **Nonforest Land and Noncommercial Forestland:**

Nonforest land and noncommercial forestland fail to meet all forestland eligibility requirements. Nonforest land may fall into property class three (agricultural or nonqualified agricultural land) or property tax class four (residential, commercial or industrial land). Noncommercial forestland may be productive or nonproductive land. Productive noncommercial forestland is land that meets the minimum productivity requirement of 25 cu.ft./ac./yr. @ CMAI. An example is a stand of fast-growing Douglas-fir, in a subdivision that does not allow commercial timber harvest.

Nonproductive, noncommercial forestland is land that cannot meet the minimum productivity requirements. Examples include juniper, limber pine and ponderosa pine. They stand on adverse sites that produce less than 25 cu. ft./ac./yr. @ CMAI. Noncommercial forestland is treated the same as nonforest land when determining the property tax class.

### **Minimum Stocking Rate:**

Stocking rate is a measure of degree that an area is effectively occupied with standing trees. Stocking rate can be described as either the number of stems per acre or the amount of crown closure per acre. Montana's tax system uses both definitions.

When classifying existing forestland, the land must cover a minimum of 10 percent crown closure of commercial tree species. The amount of crown closure can be estimated by extending an imaginary circle around the edge of the tree's crown to the ground. The area covered by tree crowns is then compared to the area not covered by tree crowns.

There is an exception to the minimum stocking rate (crown closure). Existing forestland that has had trees removed through timber harvest or natural disasters is still classified as forestland. However, if forestland does not regenerate commercial tree species within 10 years after harvest operations or from natural disasters, the land may be reclassified to nonforest land.

A landowner may wish to convert nonforest land to forestland. This typically occurs on small ownerships, where the landowner wants to meet the 15-acre forestland requirement. The landowner must plant a minimum of 300 commercial tree seedlings per acre to convert nonforest land to forestland. The 300 seedlings per acre are approximately equivalent to a spacing of 12 feet by 12 feet. Landowners should be encouraged to plant more seedlings than the minimum amount. Mortality, particularly in the first few growing seasons will reduce the stocking level. If landowners do not plant an adequate number of seedlings to cover mortality losses, they risk the possibility of not meeting the minimum stocking requirement for forestland classification.

### **Area Requirements:**

Forestland must contain at least 15 acres of contiguous commercial timber, comprising at least 10 percent stocking, unless the trees have been harvested or destroyed by natural disaster. The forested area must be in the same ownership, and at least 120 feet in width. Forested

land that does not meet the area requirements is classified as nonforest land. An example of nonforest land is a 14-acre stand of Douglas-fir.

Nonforest land is land that is at least five acres in size and 120 feet in width. Nonforest area requirements *are not* tied to ownership. If nonforest is less than five acres in size or 120 feet in width and surrounded by forestland, the nonforest area is absorbed into forestland classification. If adjacent forestland contains two productivity grades that touch the nonforest land, the lower productivity grade is used. An example is a road in the same ownership, that is 60 feet wide and surrounded by forestland. The road is classified as forestland and graded the same as surrounding land.

### **Ownership:**

A landowner is the legal entity that holds the property rights under law to the land surface. Land parcels are in the same ownership, even if a landowner owns a parcel in free simple title and is purchasing another parcel under a contract. However, any change to the name listed as the legal entity results in a change in ownership.

For example, if a landowner owns a parcel in his name, but owns another parcel in conjunction with his wife, this represents two different ownerships. Another example of two ownerships, is a parcel owned by an individual and another parcel listed in the individual's corporate or trusts name. The individual in both instances is the same person, yet the bundle of rights for each parcel is different.

If a landowner uses different versions of their name on different deeds, the multiple parcels are still considered part of the same ownership. This is a common occurrence when a landowner signs a deed with a middle initial and another deed with their full middle name. Department staff may require the landowner sign an affidavit testifying that both signatures are from the same person.

### **Contiguous Parcels of Land:**

Multiple parcels of land in the same ownership are considered contiguous if:

- The parcels are physically touching or share a common boundary.
- The parcels would have touched or shared a common boundary if they had not been separated by natural or manmade features. These physical features are primarily rivers and streams, roads, utility lines and railroads.
- The parcels would have touched or shared a common boundary if they had not been separated by land leased by the landowner from the federal or state government.

### **Contiguous Forestland:**

Contiguous forestland is forested land that:

- Physically touches or shares a common boundary
  - Is not separated by nonforest land
- Is not separated by another ownership

## **Contiguous Forestland versus Contiguous Parcels of Land:**

A clear distinction must be made in the discussion of contiguous lands. Different criteria are used to decide whether parcels in the same ownership are contiguous and whether the ownership has contiguous forestland. Natural and manmade features that have no bearing on the determination of contiguous parcels may or may not have a bearing on the determination of contiguous forestland.

Forested land in the same ownership that is separated by nonforest land is not considered contiguous to each other. Multiple forested areas, separated by nonforest lands, different ownerships or individually that do not total 15 acres or more in size are classified as nonforest land.

The distance that separates two parcels of land in the same ownership, because of physical features such as rivers and streams, roads, utility lines and railroads, has no bearing on the determination of contiguous parcels. It is irrelevant whether a river is 30 feet wide or one mile wide. The parcels are contiguous lands if they shared or touched a common boundary, had it not been for the river. The parcels are contiguous even if the river is in a different (public) ownership. This allows a landowner with multiple parcels, more favorable property tax classifications that are possible from owning larger areas of contiguous land.

By themselves, rivers and streams, roads, utility lines and railroads, do not create noncontiguous forested land. Forested land that contains these physical features is not automatically disqualified from forestland classification. Nonforest land must be at least 120 feet in width and five acres or more in size. If physical features create nonforest land that meets these size requirements, then surrounding forestland is not contiguous to each other.

For example, if a 30-foot wide road passes through forestland, then the forestland on each side of the road is contiguous if the road and forestland are in the same ownership. The road is classified as forestland and graded the same as the surrounding land. However, if the road is in different ownership, the forestland on each side of the road is noncontiguous and the road is classified as nonforest land.

Regardless of ownership, if the road creates a 120-foot width of nonforest land through forested land, the forested land on either side of the highway is noncontiguous. In this situation, the forested area on each side of the highway must be in the same ownership and be at least 15 acres in size to be classified as forestland.

## **Forestland Use Versus Other Uses:**

Livestock grazing is a multiple use practice on private forestland. The land is producing timber and livestock forage. Forestland classification *supersedes* grazing land classification when this multiple use occurs on the same ground. If livestock grazing occurs on forestland, the land is classified as forestland, including clear-cut areas.

Forestland is often converted to other uses. If the timber is clear-cut and the stumps removed, the clear intent of the landowner is to exclude future regeneration of trees. If a situation occurs, the land is reclassified to the appropriate use. Usually, the landowner's intent is to convert forestland to pasture or farmland.

Residential, commercial or industrial land cannot be classified as forestland. Land becomes residential, commercial or industrial when manmade improvements are constructed on or under the property. Examples of forestland converted to residential use are a subdivision in which the roads are paved, community water and sewer improvements are constructed or a 1-acre site is built. Examples of industrial use are a lumber mill and the surrounding log yard or mining operation.

Use classification is based on the actual use of land. Land platted as a subdivision is not basis alone to classify land as residential property. Bare land in most rural subdivision is classified as forest, nonqualified agricultural or agricultural land. A subdivision with minimal improvements to the land does not justify residential classification unless the contiguous ownership(s) is less than 20 acres in size or does not meet the forest eligibility requirements.

If forested land is restricted from timber harvest by covenants, deed restrictions, governmental decree or other operation so law, then the land is removed from forest classification. The restrictions that preclude timber harvest must be relatively absolute. For instance, subdivision may have a covenant that disallows commercial logging, but allows timber cutting for personal use, such firewood or disease control. In this situation, forestland classification is granted. If covenants preclude all commercial logging, except to clear a homesite and a road to the home, then the restriction against timber use is absolute and forestland classification is denied.

An example of productive forestland, classified as nonforest lands because of a governmental decree, are private land holdings in Glacier Park. Because of their location, the federal government will to allow logging trucks to haul logs out of the Park. Therefore, harvesting private timber in Glacier Park will always be unfeasible.

Conservation easements are commonly used to reduce state and federal income taxes and are an exception to the timber utilization rule. Some landowners establish easements that preclude commercial logging. This type of easement is not a basis to reclassify forestland to another land class. The Conservation Easement Act specifically disallows the use of conservation easements to reduce a landowner's property tax. This most likely would occur if forestland were reclassified to poor grazing land. The Montana Wood Products Association, Montana Tree Farmer's Association and the Forest Industry have publicly stated that conservation easements precluding timber harvest should not impact forestland classification for property taxation

### **Commercial Tree Species:**

Tree species are divided into two taxonomic categories called Gymnosperms and Angiosperms. Conifers are the most important Gymnosperms. In the Pacific Northwest, conifers have historically played a major economic role in a state's development. Examples of conifers found in Montana are ponderosa pine, Douglas-fir, lodgepole pine, alpine fir and engelmann spruce. The layman term for conifers is softwood.

Angiosperms are the most common and complex plants in the world. Angiosperms are commonly distinguished from conifers by their broad leaves. A generic term for these trees is hardwoods. In taxonomic nomenclature, softwoods and hardwoods should not be confused with the hardness of the wood. Many softwoods conifers have wood that is harder than hardwoods. Examples of hardwoods found in Montana are cottonwood, aspen, alder and birch. Hardwood species such as oaks are not native to Montana. The only native maple is Rocky Mountain Maple.

In Montana, the economic impact of hardwoods to the Lumber Industry is minor. Hardwoods generally do not grow in quantities and quality to manufacture commercial wood products, although some cottonwood is sporadically manufactured into wood pallets. Because hardwood inventories are declining in the state, have limited commercial use and produce concerns over logging in riparian areas, they are not considered commercial tree species for property taxation.

All hardwoods are classified as noncommercial forestland and treated as nonforest. Conifers are the only commercial trees species recognized for property tax purposes. Yet, even some conifers are considered noncommercial tree species. Rocky Mountain juniper, limber pine, and whitebark pine are the principal conifer species treated as noncommercial trees. Low site productivity and poor lumber utility are major factors that make these conifer species noncommercial forest products.

### **Physically Inaccessible Forest Land:**

Land cannot be classified as forestland if it is incapable of yielding commercially marketable wood products because of adverse site conditions or if it is physically inaccessible to most forms of harvest equipment, now or prospectively.<sup>8</sup> This rule is used in very narrow terms. The important consideration is the term “prospectively.” Most forestland can be harvested with logging equipment that is available today. Logging does not have to be currently profitable to classify a parcel as commercial forestland. Land is classified as nonforest if constructing a road to a forested area is virtually impossible. If helicopter logging is the only option to harvesting an area, then the property is classified as nonforest land. Examples are forested land that sits above or beyond a rock cliff, that is impossible to bypass, or inaccessible forested land on the opposite side of a river.

If a landowner is landlocked and denied access to the property, then the property is classified as nonforest. If forestland property is landlocked, but the landowner is allowed access by adjoining neighbors, then the land remains in forestland classification. Again, the term “prospectively” is important. Access to land can change over time with changes in ownership. *Under no circumstances are the productivity grades lowered as a result of access problems.*

### **Cultivated Christmas Tree Plantations, Ornamental Trees and Windbreaks:**

Cultivated Christmas tree plantations, ornamental trees and windbreaks *are not* eligible for classification as forestland. Cultivated Christmas, ornamental and nursery tree plantations are agricultural operations that must meet agricultural eligibility requirements. Natural growing trees on forestlands that are sheared and harvested as Christmas trees *are* eligible for forestland classification.

Plantation Christmas trees are planted from rootstock and are usually spaced approximately six-foot by six-foot intervals on relatively level ground. The soils are cultivated to control weeds and promote good growing conditions. The most common plantation trees are scotch pine, spruce and grand fir. Wild Christmas trees are naturally growing native trees located in noncultivated, mountainous regions. The trees are usually Douglas-fir. They are periodically sheared and tapered.

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<sup>8</sup> ARM. 42.20.162 (1)



# Forest Land Valuation

The valuation formula for commercial forestland is found in 15-44-103 MCA, **Legislative intent-value of forest lands-valuation zones**. In calculating the forestland valuation schedules, the income approach to value is used. Net forest and other agricultural income are capitalized. This formula calculates the net mean annual revenue of forestland. The basic formula is  $V=I/R$ , where:

V = per acre forest and other agricultural productivity value  
I = per acre net income of forestlands  
R = capitalization formula

The forest productivity formula can be further defined as:

$$V = \frac{((M \times SV) + AI) - C}{R}$$

Where:

M = mean annual net wood production  
SV = stumpage value  
AI = per acre agricultural-related income  
C = per unit cost of the forest product and the agricultural product

The valuation approach assumes an all-aged forest. This method assumes in any given year, some stands are harvested, some are planted and some are thinned. Each productivity value represents a range of productivity, income, costs and interest rates.

Income and expense data represents averages for each forest valuation zone for a five-year base period. The base period is the most current period in which data is available before a new reappraisal cycle.

The income and expense data is adjusted to constant dollars using the consumer price index. These figures are then brought forward to represent the last fiscal quarter before the appraisal date for the new appraisal cycle.<sup>9</sup>

## **Forest Valuation Zones:**

The state has five forestland valuation zones. A valuation zone is designed to recognize the uniqueness of marketing areas, timber types, growth rates, access, operability and other pertinent factors of that zone. These zones are determined by looking at the major independent variables from state timber sales and analyzing their relationship to stumpage price. Log flows to manufacturing centers and sale population in a regression analysis are major variables considered in this process.

## **Forest Income:**

The forest income is calculated using the average stumpage value for each zone. The average stumpage value represents the price a willing buyer would purchase stumpage from a

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<sup>9</sup> Implicit price inflators and deflators represent a fiscal quarter and cannot be used to adjust figures to a specific day in time.

willing seller. No government agency or private organization compiles information on private timber stumpage in Montana. Therefore, average stumpage values are derived from state timber sales using multiple regression models.

### **Forest Costs:**

No government agency or private organization collects forest costs on private forestlands. Forest costs on federal land are not indicative of forest costs on private land. Therefore, the department uses costs incurred by the Montana Division of Forestry, Department of Natural Resources and Conservation. The Division of Forestry (DOF) costs are highly dependent on the timber sale activity and budget considerations of the legislature. Forest costs include fire assessment fees, slash disposal, forest management, timber sales, forest practices and administration.

### **Other Agricultural Income:**

Livestock grazing is the primary agricultural activity occurring on forestlands. Net grazing income on forestland is low because the carrying capacity under most forest canopies is poor. In fact, timber stands with crown closures of 70 percent or greater have virtually no livestock carrying capacity. The available animal units on commercial forestland are taken from the 1977 State and Private Forest Inventory conducted by the Montana State Division of forestry and the United States Forest Service. The grazing rents on private land are obtained from the Montana Agricultural Statistic Service in Helena.<sup>10</sup>

### **Other Agricultural Expenses:**

Agricultural expenses are set at 25 percent of the grazing rental fee. The procedure is identical to the approach taken by the Montana Agricultural Advisory Committee concerning grazing expenses.

### **Capitalization Rate:**

The capitalization rate for land is composed of a discount rate plus an effective tax rate. Each valuation zone has a unique capitalization rate.

A single, statewide discount rate is calculated for forestland. The discount rate represents a 5-year average interest rate. The annual rate is calculated by the Northwest Farm Credit Services in Spokane, which in turn, is used by the Internal Revenue Service to determine agricultural property values for inheritance tax purposes.

An effective tax rate is calculated for each forest valuation zone. The effective tax rate represents the average forestland tax liability to forestland appraised value in each valuation zone.

### **Forest Valuation Schedules:**

All five valuation zones have a valuation schedule containing four values, one for each productivity grade. The four productivity grades and five valuation schedules produce 20 productivity values in the state. Valuation schedules are updated at the beginning of each appraisal cycle.

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<sup>10</sup> Agricultural rents are based on the number of animal units that can be supported for one month (AUM's).

# *Forest Valuation Due to Natural Disasters*

The Forestlands Tax Act makes it possible for landowners to receive a reduction in forestland assessment when their standing timber is destroyed by natural disasters. Fire is the most common natural disaster. However, high winds, insects and disease may also cause significant destruction to standing timber.

Eligible forestland owners receive a 50 percent reduction in assessed value for 20 years from the date of the natural disaster. No modification is made to the forest classification or the forest productivity grade. Unless the standing timber is destroyed by natural disasters, forestland values *are never* modified due to situations existing on individual properties. To receive a natural disaster reduction, the following criteria must be met.

- The natural disaster occurred after December 31, 1993.
- The applicant files a timely request for valuation review (AB-26).
- The land impacted by the natural disaster must have been classified as commercial forestland prior to the loss.
- The impacted area must be at least 15 acres or larger.
- The impacted forestland must have had at least 10 percent stocking *before* the natural disaster occurred (i.e. clearcuts are not eligible for natural disaster reductions).
- The surviving trees on the impacted forestland cannot occupy more than a 10 percent stocking rate *after* the occurrence of the natural disaster (i.e. most of the live trees must have been destroyed).

## **Natural Disaster Map Procedures:**

Currently, the forestland tax system does not function in an active GIS. All assessment work is manually conducted on the mylar forestland classification maps and CAMAS. Once the state's cadastral project is completed and the forestland database is updated, some manual procedures will be eliminated. Until the forestland tax system is GIS automated, the instructions in this section will apply.

The following steps must be performed when processing a natural disaster reduction.

1. The taxpayer or his/her agent must file an AB-26 requesting a review of the forestland value due to a natural disaster loss.

The timber loss must be identified on aerial photography. The best solution is to use photography flown after the loss. Typically, the state or federal government will do this on major fires. If other government photography is used as a reference, the boundaries of the destroyed timber should be delineated on the department's 4 inch to 1 mile scale photography. If no current photography is available, a field inspection is necessary. A china marker should be used to designate the boundary on the aerial photography.<sup>11</sup>

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<sup>11</sup> Also known as a grease pencil.

2. Transfer the boundaries from the photography to the forestland classification map(s). This is accomplished by placing the mylar classification maps over the aerial photo. Major cartographic and topographic features should be aligned between the map and photograph. Use a colored pencil to designate the boundary on the classification map. The impacted area can be identified by placing hash marks facing inward from the boundary lines. A name designation and the year of the loss can also be placed in the impacted area (example: 2000 - Ryan Creek Fire).
3. The parcel boundary and geo-code should be delineated on the classification map. Use a dot grid or planimeter to determine productivity grade acreage that was impacted for each parcel. If the parcel also contains forestland that was not affected by the natural disaster, the unaffected acreage for each productivity grade must be calculated separately from land that had timber destroyed.

### **Natural Disaster CAMAS Data Entry:**

*The following instructions will apply until the VISION system replaces CAMAS, MODS and BEVS in 2001. New VISION procedures will replace these instructions at that time.*

The natural disaster reduction is due to destruction of the timber. *Therefore, a new value before reappraisal (VBR) must be manually calculated.* In order for CAMAS to properly calculate the phase-in value, the VBR must be recalculated as if the loss had occurred prior to the VBR. The following example illustrates this procedure.

### **VBR Calculation:**

Assume:

- Forest Valuation Zone 1
- 40 acres Productivity Grade 2 Forestland Timber Destroyed
- 20 acres Productivity Grade 2 Forestland Timber *not* Destroyed
- 1994 *full* Reappraisal Value for Grade 2 = \$501.26
- 1994 50% Reappraisal Value for Grade 2 = \$250.63
- 100 acres Productivity Grade 3 forestland Timber Destroyed
- 1994 50% Reappraisal Value for Grade 3 = \$178.67
- Assessment For Tax Year 2001

Procedure:

(40 ac.)(	\$250.63)	=	\$10,025.20
(20 ac.)(	\$501.26)	=	\$10,025.20
(100 ac.)(	\$178.67)	=	\$17,867.00
<b>Total VBR</b>		<b>=</b>	<b>\$37,917.40</b>

### **Data Entry Steps:**

1. Go to CAMAS.
2. Go to screen 060 (RES S1).

Update line 461 – appraisal inspection. Date, time, appraiser ID and reason code. Use reason code 0 (ag/forest review) and code 5 (AB-26 review).

Update line 462 – clerical update of appraisal information. Date, time, clerical ID and reason code. Use reason code 0 (ag/forest land data) and code 4 (edit review and correction).

3. Update line 468 – review date and reason code. The natural disaster reduction lasts for a 20-year period. Enter January 1 of the year the reduction is terminated. Example: for a fire in year 2000, enter 1-1-2020. Use reason code 17 (natural disaster review).
4. Go to screen 170 (RES S2).
5. Update line 481 – property notes. Use code CR (continued review) in the code column. Enter the explanation on the description line. Example: 2000 Ryan Creek Fire.
6. Go to land screen 321 (RES-S4).
7. Update the forest productivity grades and acres for the impacted land. If some timber was destroyed and some timber wasn't, separate the loss on different lines by productivity grades. *If all timber in the parcel was destroyed, skip this step.*
8. Enter an influence code E in the influence column for the impacted land. *Do not* insert the numeric figure 50.
9. Enter the year of the natural disaster reduction is terminated in field 341. The natural disaster reduction lasts for a 20-year period. *Do not* use the application date filed with the department if the filing date is different from the year of the fire. Example: for a fire in year 2000, enter 2020. This field notifies the department to remove the natural disaster reduction in 20 years.
10. Enter 991 to recost the parcel.
11. Enter 999 to save the changes.
12. Enter “no” to building new construction and “yes” to the land use change on the pop-up menu that says:<sup>12</sup>

Building/New Construction	Y or N
or	
Land Use Change	Y or N

13. Go to PA for updates.
  14. Go to screen 901.
  15. Update line 905 and enter reason code 5 (AB-26).
  16. Go to screen 839.
  17. Update the “before reappraisal” field for 1901 with the hand calculated VBR (see example above).
  18. Update the existing VBR reason code with reason code DX.
  19. Enter 839 in the “next field” and examine the recalculated phase-in value.
  20. Go to screen 985 – AB26. Update AB-26 information on this screen.
- If the phase-in value is correct, enter 999 in the “next field” and save the changes.



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<sup>12</sup> Enter “yes” if a portion of the building improvements were also destroyed.

# Forest Productivity Maps

When the forestland productivity tax system was developed, the project lacked funding, time and a statewide cadastral database. For those reasons, the department decided not to link a GIS to CAMAS. The alternative was to produce physical classification maps.

The department received one mylar map for each township in each county with forestland. If a county boundary bisects a township and both counties contain forestland, the department received two maps for that township (one for each county). Forest classification maps were produced for all regions of the state where private forestland occurs. Townships that were totally government owned or did not contain forestland were not plotted.<sup>13</sup>

The maps are plotted as a reverse image on Mylar. The color toner is applied to the back of each map. This allows work to be conducted on the front of the map without damaging the colors or cartographic information. The cartographic features shown on maps are (1) forest/nonforest boundaries; (2) transportation systems; (3) hydrography; (4) public land survey system and (5) governmental boundaries.

The map was plotted at a scale of 4 inches to the mile (1:15,840). However, the source data incorporated into the final map product was acquired at varying map scales. The topological and soil information used in the growth model is 1:250,000 scale. The transportation system, power lines, and hydrography are 1:100,000 scale and the forest/nonforest boundaries, governmental boundaries, and the public lands survey system is 1:24,000.

The forest/non-forest boundaries were mapped using satellite imagery. The department's aerial photography was used to verify and adjust the computer's interpretation of forestland delineations. Satellite imagery uses a raster format to identify locations on the ground. The ground resolution for the satellite imagery is approximately one acre in size (60 x 60 meters). To the computer, this 1-acre ground resolution is called a pixel. This creates a boundary that is blocky in appearance. A line smoothing technique called splining was used to lessen this blocky appearance.

The maps in each county are sequentially numbered in the upper left-hand corner. Township and range legal descriptions are found at the top center of the map. The geo-code for county and township/range is found directly under the township and range description. The township, range, and county are found in smaller print in the upper right-hand corner.

The section number is in the approximate center of each section. Solid red lines delineate section lines. A color-coded legend is at the bottom of the map that reflects different land classifications. The county's location within the state is reflected inside the state map in the lower left-hand corner. Adjacent to the state map is a county map depicting the township location within the county.

The maps identify nonforest lands as NF and are color-coded light gray. Dark gray areas are forested areas that are classified as nonforest land because they do not meet the 15-acre minimum forestland requirement. Noncommercial forestlands are identified as NC and are color-coded reddish-brown.

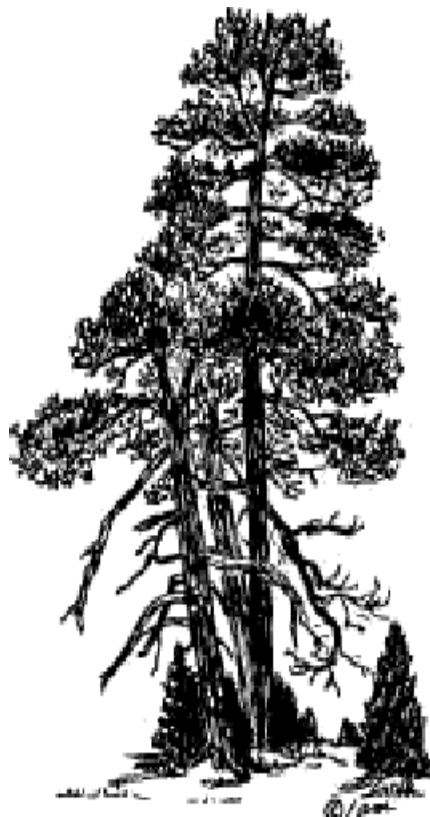
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<sup>13</sup> Fish and Game parcels are mapped if they contain forested land.

Each productivity class is color-coded with a different shade of green and designated with the Roman numerals I, II, III or IV. Class I is the most productive land, while class IV is the least productive land.

Hydrography is identified on the maps in blue. One GIS layer contains data on lakes and larger rivers mapped by a thematic mapper (satellite imagery). These features were plotted in solid blue. Another GIS layer contains water bodies digitized from U.S.G.S. maps. These delineations are identified on the map as solid blue lines. The government land office survey (GLO) of the high water mark on navigable rivers and lakes is identified on the map as a dark blue dashed line.<sup>14</sup>

The thematic mapper displays data in a raster format. The U.S.G.S. data is displayed in digital line format. Because both data layers contain data on the same ground feature, the same water body is plotted twice on the map. The different water body delineations do not overlay each other perfectly on the map. Occasionally, the water bodies plotted by the thematic mapper touch or slightly overlay a road or another cartographic feature shown on the map. This can happen when cartographic elements are captured at different map scales; and using different methods of digitizing are plotted on the same map.



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<sup>14</sup> The low water demarcation on these maps does not meet federal map accuracy standards.



# Assessment Procedures

All forestland assessment work is manually conducted on the mylar classification maps. When the state's cadastral project is completed and the forestland database is updated, many manual assessment procedures will be eliminated. Until the forestland tax system is GIS automated, the instructions in this section will apply.

The first step in assessing a forestland parcel is delineating the property boundaries on the mylar maps. Plat maps or certificate of surveys should be used to transfer property boundaries onto the classification maps. Rectangular survey descriptions can be drawn on the maps with the aid of a ruler.

Metes and bounds descriptions are difficult to delineate accurately on the maps. Plat maps are usually displayed at a larger scale than the forest classification maps. The plat scale can be reduced to a 1:15,840 map scale by using a photocopier. Most photocopiers have a reduction/enlarger option. This procedure requires some experimenting with the degree of plat map reduction to get the desired match. Once the plat map is reduced to a 1:15,840 scale, trace the property boundaries onto the mylar classification map.

Write the geocodes for each parcel on the map. Property boundaries are typically delineated on the map with a purple pencil. Geo-codes are typically written with a black pencil. Do not write property owner names on the maps. New property boundaries should be manually drawn on the map when a parcel is subdivided. Update the geo-codes, acreage figures and land grades when the parcel is subdivided. Use a dot grid or a planimeter to calculate the acreage of each land classification and grade for each parcel. The acreage for each grade on the property can be written on the map.

The GIS did not plot agricultural classifications and grades on the forestland maps. To avoid classification errors when assessing agricultural and forestland, agricultural classifications and grades should be transferred to the forestland maps. Use the agricultural classification maps to conduct this work. All agricultural classifications are done in the nonforest areas shown in gray.

Extreme care must be exercised when doing this task. Agricultural and forestland classifications should never overlap. The agricultural boundaries and other cartographic features on the agricultural maps do not match the boundaries and cartographic features found on the forestland maps. Methodology, technology, mapping sources and time differences in map-making, combine to produce significant differences between the agricultural and forestland maps.

When agricultural classifications and grades are transferred to the forestland maps, aerial photography must be used to facilitate this procedure. *Do not* place the agricultural map under the forestland map and align them by section corners. This may result in agricultural delineations in the wrong location or overlapping forestland classifications. Agricultural classifications must be manually adjusted to fit within the confines of the nonforest boundaries on the forest classification map.

## **Data Entry:**

*The following instructions will apply until the VISION system replaces CAMAS, MODS and BEVS in 2001. New VISION procedures will replace these instructions at that time.*

Forestland schedules are stored in the computer-assisted land pricing (CALP) table of CAMAS. All five valuation schedules are stored in county 99 and are inaccessible to most department staff. Internal system identifiers direct each county to the appropriate forest valuation schedule.

Data entry steps in CAMAS are similar to those procedures discussed in chapter 8 *Natural Disaster - Data Entry*. Appraisal and clerical data is updated in screen RES S1, lines 461 and 462. Refer to the appraisal manual for the appropriate reason codes. If continued review is necessary, update line 468. Property notes are entered on screen (RES S2), line 481 and the description line.

Land data is entered on screen (RES S4) beginning on line 321. Enter the acre type (9), forestland grade(s), acres per grade, nonforest classification and the nonforest grade(s). The system will automatically enter the forestland property tax class code 1901, based on the acre type code 9. Appraisal codes are listed in the common data section of the appraiser's manual.

Enter 991 to recost a parcel. Enter 999 to save the file. A new VBR is manually calculated if land use is reclassified or a natural disaster occurs (destruction). Reclassification work includes changing forestland to nonforest land or visa versa. A new VBR *is not* recalculated if agricultural or forestland grades are changed. See chapter 8 *Natural Disaster – VBR Calculation* for the procedure to recalculate the VBR.

Go to the PA screen 901 and update line 905. If the VBR is manually recalculated, go to screen 839 and enter the "before value" and the appropriate reason code. Then go to screen 985 and update the AB26 information. Once you determine that the VBR, reappraisal value and the phase-in value are correct, enter 999 in the "next Field" and save the changes.



# Forest Map Maintenance

*The following instructions will apply until the GIS project updates the forestland database and links it to the VISION appraisal system. New maintenance procedures will replace these instructions at that time.*

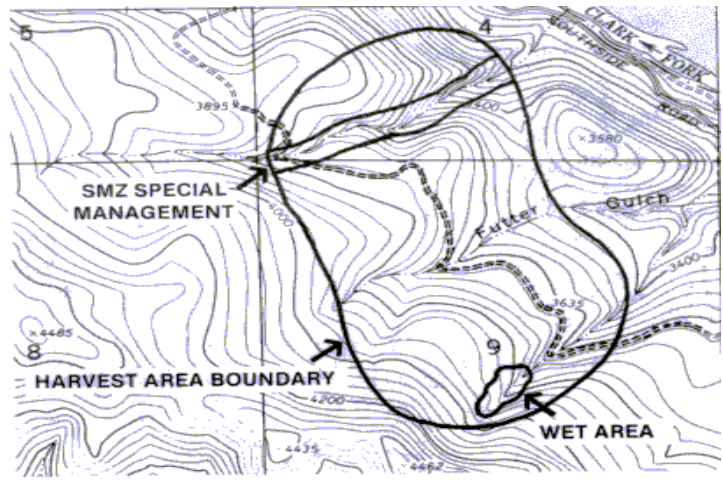
If changes are made to the original map features, then the toner must be removed from the back of the map. The color toner is sprayed with a special sealer and a solvent such as acetone is used to remove the sealer and toner. When the toner is removed, the affected area on the map is milky white in color.

Once the toner is removed, manually draw new delineations on the front of the map. This work is generally done with the aid of aerial photography. The most common adjustments to the map features are forest/nonforest boundaries and water delineations. Black colored pencils are used for boundary delineations. Green pencils are used to designate forestland. Blue pencils are used to designate water bodies.

Care should be taken when transferring mapping boundaries between aerial photographs and forestland maps with different map scales. Map scale is the relationship between the map size and the ground distance. For instance, a map scale of 1:15,840 means each unit of measurement on the map equals 15,840 units on the ground. The department's aerial photography and the forest productivity maps are the same map scale; 4 inches equal 1 mile (1:15,840). Aerial photography used by other government agencies is usually different.

The semi-transparent mylar map can be laid over the top of an aerial photo. Photo features are then viewed through the mylar. Trace the corrections onto the mylar map. Never align section corners located on an aerial photo with the section corners on the map to make corrections to the map. The aerial photograph may contain substantial ground distortion. In addition, the section corners may be incorrectly located on the photo.

Cartographic features such as roads and streams are aligned with the same features on the photograph. This is done in the immediate vicinity of the corrections that are made to the map. The map is constantly realigned with the photo as the correction area gets larger. Only when the map is properly aligned to the ground features on the photo, should information be traced from the photo to the map. Contact trained personnel in the central office for assistance when adjustments are warranted to forestland map features.



# Tax Class Treatment of Land

All land must be placed in one of three different property tax classes. They are: agricultural and nonqualified agricultural land (class 3); residential, commercial and industrial land (class 4); or forestland (class 10). Refer to the department's procedure 2-3-004.1 - *Tax Classification of Land*.

One acre under residential improvements on forestland is valued at market and it is placed in property tax class four. If a residential building site is cleared from forestland, then one acre under the residential improvement is classified as a 1-acre building site on forestland (code 2003). If a property contains forestland, but the residential improvement is constructed on nonforest land, the building site is classified as either 1-acre on nonqualified agricultural land (code 2002) or one-acre on agricultural land (code 2001). The procedure for removing and appraising a building site under residential properties is discussed in ARM 42.20.134 and 42.20.135. The acre type for a 1-acre building site on forestland is 3.

The following steps are followed to determine the proper tax classification of land.

- Step 1** Determine if the parcel meets the forestland eligibility requirements pursuant to ARM. 42.20.160 – 42.20.164. If yes, then classify only the forested area that meets the criteria as forestland. If the parcel or portions of the parcel do not meet forestland eligibility requirements, go to step 2.
- Step 2** Determine if the parcel meets the agricultural eligibility requirements pursuant to ARM. 42.20.139 – 42.20.153, and ARM 42.20.157. If yes, classify the nonforest land according to its agricultural use. If the parcel does not meet agricultural land eligibility requirements, go to step 3.
- Step 3** Determine if the parcel meets the nonqualified agricultural eligibility requirements pursuant to ARM. 42.20.152. If yes, classify the land as nonqualified agricultural land. If the parcel does not meet the nonqualified agricultural eligibility requirements, go to step 4.
- Step 4** All land that does not meet the eligibility requirements found in steps one through three is classified as class four property.<sup>15</sup>



<sup>15</sup> Nonforest land on contiguous ownerships under 20 acres in size that also contains forestland is usually valued at market. Nonforest land on these ownerships cannot meet nonqualified agricultural eligibility requirements and must meet the agricultural income requirements for agricultural classification.

# On-Site Inspections

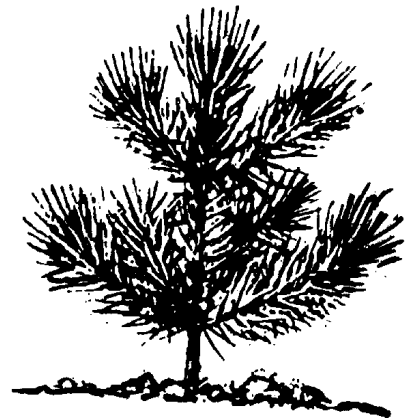
When necessary, the department must conduct an on-site analysis to estimate forest productivity or determine forestland eligibility. The measurement of a site index and potential volume yield should be conducted by trained foresters. Technical questions concerning forest productivity should be referred to a tax specialist in Helena.

Site index curves used by Region One of the United States Forest Service for tree species found in Montana are found in Tables I through IV. In western Montana, the site index figures are applied to the Yield Table found in Table V. No published yield table will provide reliable estimates for central and eastern Montana.

To make valid field measurements, the site must be relatively undisturbed by man or other natural causes. Measurements are made on “site trees” and these measurements are then referenced in a site index table. Site trees should be dominant or co-dominant in respect to their height position in the stand. The trees must be relatively uncrowded and unaffected by insects and disease. Tree rings should not show inhibited growth from any factor for more than 20 straight years. Site trees should be between 20 and 80 years in age.

Occasionally, an office review cannot determine if an ownership meets the 15-acre forestland eligibility requirement. All landowners with properties less than 20 acres in size that contain forestland should be asked to apply for forestland classification. The forestland classification maps do not accurately delineate forest/nonforest boundaries to within a few acres. The margin for error, when determining forestland acreage from the maps on small properties is significant. Therefore, small ownerships should have an approved *AB-3T* on file in the local DOR office. A forestland application forces the department to conduct a thorough review of the property.

In some cases, an area traverse is conducted on the nonforest area to determine how much forestland is contained on the remainder of the property. Distances and bearings are first determined for the nonforest land. The data is then entered into an acreage calculation program to determine area. The nonforest area is then deducted from the total area of the ownership to determine the forested acreage.<sup>16</sup>



<sup>16</sup> A GPS unit can automatically calculate acreage by walking the boundary of the forest or nonforest area.



# Forestland Administrative Rules

**42.20.160 FOREST LAND ASSESSMENT** (1) Effective January 1, 1994, the department of revenue shall assess land as forest lands according to the following basic determinations.

- (a) Forest lands are:
  - (i) contiguous land of 15 acres or more in the same ownership that is capable of producing timber that can be harvested in commercial quantity;
  - (ii) land which is producing timber or land in which the trees have been removed by man through harvest, including clearcuts, or by natural disaster, including but not limited to fire;
  - (iii) land which is not classified as nonforest land. Nonforest land is used for agricultural, nonqualifying agricultural, industrial, commercial or residential purposes. (History: Sec. 15-44-105, MCA; IMP, Sec. 15-44-101, 15-44-102, and 15-44-103, MCA; NEW, 1992 MAR p. 2650, Eff. 12/11/92; AMD, 1998 MAR p. 2505, Eff. 9/11/98.)

## **42.20.161 FOREST LAND CLASSIFICATION DEFINITIONS**

(1) Effective January 1, 1994, the department of revenue shall use the following definitions to determine forest land classification and the productive capacity of land to grow timber:

- (a) The phrase "capable of producing timber that can be harvested in commercial quantity" means, forest land that can produce 25 cubic feet or more of stemwood per acre per year in live softwood trees, 1.0 inch in diameter at breast height, at the culmination of the mean annual increment (the point of maximum wood production) for fully-stocked, natural stands; and
  - (i) is at least 10 percent stocked with softwood timber of any size on an area at least 120 feet in width; or
  - (ii) has been converted from another use and exhibits a minimum stocking rate of 300 seedlings and/or saplings per acre (12 foot average spacing); or
  - (iii) meets the stocking requirement specified in (i) and (ii) of this rule, but has had the trees removed by man through timber harvest or by fires and other natural disasters, and has or will be, naturally or artificially regenerated within 10 years.
- (b) The term "producing timber" is defined as including trees removed through harvest, clearcut or by natural disaster such as fire.
- (c) For purposes of determining the minimum 15-acre forest land ownership criteria identified in 15-44-102, MCA, the term "contiguous land" means land that touches or shares a common boundary or that would have shared or touched a common boundary had the lands not been separated by rivers and streams, county boundaries, local taxing jurisdiction boundaries, roads, highways, power lines and railroads. For purposes of determining forest land classification, that land must be uninterrupted forest land that meets the requirements of ARM 42.20.160 and is unbroken by nonforest land.
- (d) The term "diameter at breast height" (d.b.h.) means the average stem diameter, outside bark, at a point 4.5 feet above the ground.
- (e) The term "stocked" means a measure of the degree to which an area is effectively covered with living trees.
- (f) The term "fully-stocked" means the highest degree in which a stand could fully utilize the site's capacity to grow trees.
- (g) The term "natural stands" means fully-stocked, even-aged softwood stands which are naturally regenerated.
- (h) The term "ornamental trees" means trees grown commercially to ornament and decorate or for use as shade trees or windbreaks.
- (i) The term "site" means the capacity of at least 15 contiguous acres to grow timber.
- (j) The term "stemwood" means the bole or trunk of the tree, excluding the roots, branches and needles.
- (k) The phrase "forest site productivity class" means the range of site quality which expresses the timber production potential of a site in terms of cubic-foot volume growth per acre at culmination of mean annual increment (the point of maximum wood production) in fully-stocked natural stands.
- (l) The phrase "mean annual increment" is a measure of the average yearly increase in volume produced on one acre. This increment can be calculated by dividing total stand volume by the total age. Mean annual growth increases as the stand matures, attains a maximum growth increment at a later age, then decreases as the growth rate decreases. Volume is expressed in cubic feet.
- (m) The term "nonforest land" means land which is at least 120 feet in width and at least 5 acres in size which does not meet the requirements of ARM 42.20.160. Nonforest land can include rivers and streams, roads, highways, power lines, and railroads. (History: Sec. 15-44-105, MCA; IMP, Sec. 15-44-101 15-44-102, and 15-44-103, MCA; NEW, 1992 MAR p. 2650, Eff. 12/11/92; AMD, 1993 MAR p. 2970, Eff. 12/10/93; AMD, 1998 MAR p. 2505, Eff. 9/11/98.)

#### **42.20.162 EXCEPTIONS TO FOREST LAND ASSESSMENT**

- (1) Effective January 1, 1994, the following land shall not be classified and assessed as forest land:
- (a) land that is incapable of yielding wood products because of adverse site conditions or which are so physically inaccessible as to be unavailable now or prospectively;
  - (b) land withdrawn from timber utilization by statute, ordinance, covenant, court order, or administrative order, or other operation of law;
  - (c) land used in the production of cultivated Christmas tree plantations which produce commercially marketable Christmas trees; and
  - (d) land used in the production of ornamental trees and trees grown for the sole purpose as shade trees and windbreaks. (History: Sec. 15-44-105, MCA; IMP, Sec. 15-44-101, 15-44-102, and 15-44-103, MCA; NEW, 1992 MAR p. 2650, Eff. 12/11/92; AMD, 1998 MAR p. 2505, Eff. 9/11/98.)

**42.20.163 FOREST LAND OWNERSHIP** (1) The department of revenue shall use the following ownership criteria in its assessment of forest land:

- (a) one ownership exists in two or more contiguous parcels of land when:
  - (i) the parcels are all owned by the same party(ies) and titled identically in their name or names;
  - (ii) the party(ies) have received title in the parcels by a transferring instrument such as a deed, contract for deed or judgment; and
  - (iii) the party(ies) have the present right to possess and use the parcels.
- (b) Proof that non-identical names are for the same party(ies), (i.e. John W. Smith is the same person as John Smith) can be provided through the filing of an affidavit. The affidavit will be available in the local appraisal/assessment office. (History: Sec. 15-44-105, MCA; IMP, Sec. 15-44-101 and 15-44-102, MCA; NEW, 1992 MAR p. 2650, Eff. 12/11/92.)

**42.20.164 FOREST SITE PRODUCTIVITY CLASSES** (1) Effective January 1, 1994, the department of revenue shall assign all forest land to one of the following forest site productivity class designations:

- (a) forest site productivity class IV (25 through 44.9 cubic feet of wood per acre per year);
- (b) forest site productivity class III (45 through 64.9 cubic feet of wood per acre per year);
- (c) forest site productivity class II (65 through 84.9 cubic feet of wood per acre per year);
- (d) forest site productivity class I (85 and over cubic feet of wood per acre per year). (History: Sec. 15-44-105, MCA; IMP, Sec. 15-44-101 and 15-44-102, MCA; NEW, 1992 MAR p. 2650, Eff. 12/11/92; AMD, 1993 MAR p. 2970, Eff. 12/10/93.)

#### **42.20.165 FOREST LAND ELIGIBILITY - GENERAL PRINCIPLES**

- (1) All parcels under one ownership that are 15 contiguous acres or greater that meet the requirements of ARM 42.20.160 and 42.20.161 shall be assessed and taxed as forest land.
- (2) The property owner of record or the owner's agent must provide proof of eligibility on an application form prescribed by the department.
- (a) Forestland application forms shall be available at each county appraisal/assessment office. Applications must be submitted to the appraisal/assessment office in the county which the property resides prior to March 1 of the year for which the reclassification is being sought or within 30 days after receiving the notice of classification and appraisal from the department, whichever is later.
  - (b) An annual application is not required. The owner or owner's agent need reapply only under the following conditions:
    - (i) the landowner believes they meet eligibility requirements and wants the department to consider the classification of the land as forest land;
    - (ii) the department has reclassified the property because of a change in the eligibility of the property, a change in property use or a change in ownership.
  - (c) The department shall review the application and may conduct a field evaluation. The department will approve or deny the application and return a copy of the form with the written decision to the property owner or the owner's agent.
  - (d) An applicant for forest land classification who is dissatisfied with the department's determination may appeal to the appropriate county tax appeal board pursuant to 15-15-101, MCA.
- (3) All terms and classification procedures pertaining to forest lands are defined in ARM 42.20.160, 42.20.161, 42.20.162, 42.20.163, 42.20.164, 42.20.166, 42.20.167, 42.20.168, 42.20.169, and 42.20.170 and the "Forest Productivity Classification Manual" as compiled by the property assessment division of the department of revenue. (History: Sec. 15-1-201 and 15-44-105, MCA; IMP, Sec. 15-44-101, 15-44-102, 15-44-103, and 15-44-104, MCA; NEW, 1993 MAR p. 2970, Eff. 12/10/93; AMD, 1998 MAR p. 2505, Eff. 9/11/98.)



**42.20.166 FOREST LAND VALUATION ZONES** (1) The department shall divide the state into forest valuation zones, with each zone designated to recognize the uniqueness of marketing areas, timber types, growth rates, access, and other pertinent factors that affect value. The designated forest valuation zones and the counties contained within each zone are:

- (a) Zone 1 - Northwest: Flathead, Lake, Lincoln and Sanders counties;
- (b) Zone 2 - West Central: Granite, Mineral, Missoula, Powell and Ravalli counties;
- (c) Zone 3 - South Central: Beaverhead, Deer Lodge, Jefferson, Lewis and Clark, Madison and Silver Bow counties;
- (d) Zone 4 - Central: Broadwater, Cascade, Gallatin, Glacier, Meagher, Park, Pondera and Teton counties; and
- (e) Zone 5 - Eastern: Blaine, Big Horn, Carbon, Carter, Chouteau, Custer, Fallon, Fergus, Garfield, Golden Valley, Hill, Judith Basin, Liberty, Musselshell, Petroleum, Phillips, Powder River, Prairie, Rosebud, Sweet Grass, Stillwater, Toole, Treasure, Wheatland and Yellowstone counties. (History: Sec. 15-1-201 and 15-44-105, MCA; IMP, Sec. 15-44-101, 15-44-102, 15-44-103, and 15-44-104, MCA; NEW, 1993 MAR p. 2970, Eff. 12/10/93; AMD, 1997 MAR p. 507, Eff. 3/11/97.)

**42.20.167 FOREST LAND VALUATION FORMULA** (1) Non-commercial forest land and non-forest land shall not be eligible for valuation as forest land. Standing and down timber on forest land shall not be separately valued and assessed.

- (2) The valuation of forest land shall be as provided in 15-44-101 through 15-44-105, MCA.
- (3) The valuation of forest land shall be based on a 5-year average of income, expense, and capitalization rate for the years 1991 through 1995.

(4) The department shall determine the forest productivity value for each forest valuation zone using the formula  $V=I/R$ , where:

- (a) V is the per-acre forest productivity value of the forest land;
- (b) I is the per-acre net income of forest lands in each valuation zone and is determined by the department using the formula,  $I = (M \times SV) + NAI - C$ , where:
  - (i) I is the per-acre net income;
  - (ii) M is the per-acre mean annual net wood production;
  - (iii) SV is the per-acre stumpage value;
  - (iv) NAI is the per-acre agricultural related income; and
  - (v) C is the per-unit cost of the forest product and agricultural product produced, if any; and
- (c) R is the capitalization rate.
- (5) Net income (I) shall include stumpage value derived from the harvest of timber on state timber sales.
- (6) The mean annual net wood production (M) shall be determined by using the following formula  $M=RA \times MAI$  where:

- (a) RA is the cubic foot to board foot ratio which converts cubic feet to board feet; one cubic foot will equal 4.1 board feet; and
- (5) Net income (I) shall include stumpage value derived from the harvest of timber on state timber sales.
- (6) The mean annual net wood production (M) shall be determined by using the following formula  $M=RA \times MAI$  where:

- (a) RA is the cubic foot to board foot ratio which converts cubic feet to board feet; one cubic foot will equal 4.1 board feet; and
- (b) MAI is the arithmetic midpoint of each forest productivity site class in each forest valuation zone.
- (7) Agricultural related income is the average net income for grazing livestock on forest lands in each forest valuation zone. Agricultural related income shall be determined by using the formula  $AI = GF \times AUM \times GC$  where:

- (a) AI is the per-acre agricultural related income;
- (b) GF is the average per-acre grazing fee on private land;
- (c) AUM is the average per-acre animal unit months on forest land; and
- (d) GC is the percentage reflecting grazing costs incurred by the landowner for maintaining fences, wells, corrals, roads and some part-time animal oversight.
- (8) The capitalization rate is the 15-year annual average interest rate on agricultural loans as reported by the northwest farm credit services, agricultural credit association of Spokane, Washington, plus the effective tax rate.

(9) The effective tax rate shall be calculated by dividing the total estimated tax due on private forest lands by the total forest value of those lands. (History: Sec. 15-1-201 and 15-44-105, MCA; IMP, Sec. 15-44-101, 15-44-102, 15-44-103, and 15-44-104, MCA; NEW, 1993 MAR p. 2970, Eff. 12/10/93; AMD, 1998 MAR p. 2505, Eff. 9/11/98.)

**42.20.168 FOREST COSTS** (1) The determination of forest costs in ARM 42.20.167 represent the average costs for reforestation, fire assessment, slash disposal, timber stand improvement, timber harvest, forest practices, and administration over the base period specified in ARM 42.20.167. Forest costs, with the exception of the fire assessment fee and administrative cost, are calculated from the actual expenditures for those activities conducted by the department of natural resource and conservation, division of forestry (DNRC-DOF). The average forest cost in each forest valuation zone is derived from DOF land management areas. The fire assessment fee will be the fee the DOF charges landowners. The administrative cost is 3 percent of the gross timber income in each valuation zone. Those costs shall be deducted from the per acre gross timber income. (History: Sec. 15-1-201 and 15-44-105, MCA; IMP, Sec. 15-44-101, 15-44-102, 15-44-103, and 15-44-104, MCA; NEW, 1993 MAR p. 2970, Eff. 12/10/93; AMD, 1998 MAR p. 2505, Eff. 9/11/98.)

**42.20.169 NATURAL DISASTER REDUCTION - GENERAL PRINCIPLES**

(1) Forest lands upon which, after December 31, 1993, trees are destroyed by fire, disease, insect infestation, or other natural disaster shall be eligible for a 50 percent reduction in assessed value for 20 tax years beginning the first full tax year following the natural disaster.

(2) The property owner of record as of January 1 of the first full tax year for which the reduction in value is sought or that owner's agent must complete an application with the appraisal office in which the property is located. The application prescribed by the department will be the Property Adjustment Form (AB-26). The application must be made by March 1 or within 15 days of receipt of the assessment list of the first full year for which the reduction in value is requested.

(3) The department shall review the Property Adjustment Form and may conduct a field evaluation. The department will issue a written determination to the applicant.

(4) The applicant shall include on the Property Adjustment Form:

- (a) applicant's name and current mailing address;
- (b) date of application;
- (c) legal description of the property where the natural disaster occurred;
- (d) type of natural disaster;
- (e) approximate size of forest land affected by the natural disaster;
- (f) date the natural disaster occurred; and
- (g) description of the damage to the timber stocking on the forest land affected by the natural disaster.

(5) Forest land shall be eligible for a 50 percent reduction in assessed value provided:

- (a) the forest land affected is 15 contiguous acres or larger in size and under one ownership;
- (b) the forest land affected contained at least 10 percent stocking of live trees prior to the natural disaster;
- (c) the forest land affected contains 10 percent stocking or less of live trees after the occurrence of the natural disaster; and
- (d) the applicant has timely filed the request for valuation review and the natural disaster occurred after December 31, 1993. (History: Sec. 15-1-201 and 15-44-105, MCA; IMP, Sec. 15-44-101, 15-44-102, 15-44-103, and 15-44-104, MCA; NEW, 1993 MAR p. 2970, Eff. 12/10/93.)

**42.20.170 FOREST LAND** (1) The following is the schedule for the classification and valuation of forest land:

(a) In effect from January 1, 1997, through December 31, 1999.

<b>Productivity Class</b>	<b>Zone 1 \$/Ac</b>	<b>Zone 2 \$/Ac</b>	<b>Zone 3 \$/Ac</b>	<b>Zone 4 \$/Ac</b>	<b>Zone 5 \$/Ac</b>
1	1333.82	1154.67	762.95	974.41	514.88
2	1038.06	900.84	595.36	761.46	403.95
3	742.30	647.00	427.77	548.50	293.03
4	446.54	393.16	260.18	335.54	182.10

(History: Sec. 15-1-201 and 15-44-105, MCA; IMP, Sec. 15-44-103, MCA; NEW, 1997 MAR p. 507, Eff. 3/11/97.)



# Definitions

**Basal Area:** The cross-sectional area at the base of a tree. This is considered the tree stump and is approximately one foot off the ground.

**Board Foot:** A block of wood 12 inches long, by 12 inches wide, by 1 inch thick.

**Bolewood:** The stem of a tree. (Usually the commercially marketable portion of the tree.)

**Capable of Producing Timber That Can Be Harvested in Commercial Quantity:** Forestland produces 25 cubic feet or more of stemwood per acre, per year, in live softwood trees, 1.0 inch in diameter at breast height, at the culmination of the mean annual increment (the point of maximum wood productions) for fully-stocked, natural stands; and

1. Is at least 10 percent stocked with softwood timber of any size on an area at least 120 feet in width
2. Has been converted from another use and exhibits a minimum stocking rate of 300 seedlings and/or saplings per acre (12 foot average spacing)
3. Meets the stocking requirement specified in 1 and 2 of this rule, but has had the tree removed by man through timber harvest or by fires and other natural disasters, and has or will be, naturally or artificially regenerated within 10 years.

**Christmas Trees:** Any evergreen tree severed from the stump and sold for use as a Christmas tree.

**Class 10 Property:** Land that meets the requirements under 15-44-102, MCA and 42.20.160 – 42.20.162 ARM.

**Commercial:** Land that meets the definition of forestland.

**Contiguous Forest Land:** Forestland that meets the requirements of ARM 42.20.160(I) through (iii) and is unbroken by nonforest land.

**Contiguous Parcels:** Parcels in the same ownership that touch or share a common boundary or that would have shared or touched a common boundary had the parcels not been separated by rivers and streams, county boundaries, local taxing jurisdiction boundaries, roads, highways, power lines and railroads.

**Crown Closure:** The percentage of forest area covered by tree crowns. A measure of the area occupied, rather than stand density.

**Cubic Foot:** The amount of wood in a block, 12 inches long, by 12 inches wide, by 12 inches high.

**Cubic Foot Volume:** The average cross-sectional area of the tree multiplied by its length to a five-inch top.

**Culmination of Mean Annual Increment:** The intersection of the current annual growth and mean annual growth. The culmination of mean annual increment indicates the age at which mean annual increment of an even-age stand is greatest. This is regarded as the ideal harvest or rotation age in terms of most efficient volume production.

**Cultivated Christmas Tree Plantations:** Cultivated land used to produce commercially marketable Christmas trees. Christmas tree plantations must contain at least two acres of land, be pruned annually and contain approximately 2,000 trees.

**Diameter at Breast Height (d.b.h.):** The average stem diameter, outside bark, at a point 4.5 feet above the ground.

**Forest:** Land and timber on the land.

**Forestland:** Contiguous land of 15 acres or more in one ownership that is capable of producing timber that can be harvested in commercial quantity and is producing timber unless the trees have been removed by man through harvest, including clear-cuts, or by natural disaster, including but not limited to fire. Lands that have not been converted to another use and on which the annual net wood production equals or exceeds 25 cubic feet an acre in live softwoods, 1.0 inch in diameter at breast height, at the culmination of mean annual increment. Lands that are at least 10 percent stocked by softwood trees of any size. Land that has had the timber reduced below 10 percent stocking by man or natural disasters, and will regenerate forest growth within ten years.

**Forestland Capitalization Rate:** The average interest rate on 15-year agricultural loans as reported by the Northwest Farm Credit Services, Agricultural Credit Association of Spokane, Washington, plus the effective tax rate.

**Forestland Owner:** The legal entity that holds the property rights under law to the forestland surface.

**Forestland Valuation Zone:** An area of the state classified as a neighborhood because it shares a common marketing area, timber types, growth rates, access, operability and other pertinent factors for market modeling of forestland.

**Forest Productivity Value:** The value of forestland for assessment purposes, which value is determined only on the basis of its ability to produce timber, other forest products, and associated agricultural products through an income approach provided for in 15-44-103.

**Forest Site Productivity Class:** The range of site quality that expresses the timber production potential of a site in terms of cubic-foot volume growth per acre at the culmination of mean annual increment (the point of maximum wood production) in fully-stocked natural stands.

**Fully-Stocked:** The highest degree in which a stand could fully utilize the site's capacity to grow trees.

**Harvest:** An activity related to the cutting or removal of timber for use or sale as a forest product.

**Landowner:** An individual, corporation, association, company, firm, joint venture, syndicate or trust.

**Mean Annual Increment:** A measure of the average yearly increase in volume produced on one acre. This increment is the total stand volume divided by the total tree age.

**Mean Annual Net Wood Production:** The average net usable volume of wood 1 acre of forest land will grow in 1 year under average current and actual forest conditions and under current and reasonable management practices.

**Nonforest Land:** Bare land that does not meet the requirements of forestland as provided for in 15-44-102 MCA, and ARM 42.20.160 – 42.44-163. This includes all noncommercial forestland, land that has never supported forest growth, and land developed for other uses.

**Ornamental Trees:** Trees grown commercially to ornament and decorate, or use as shade trees and windbreaks.

**Ownership:** The right of one or more persons to possess and use a thing to the exclusion of others. The thing of which there may be ownership is called property (70-1-101, MCA). Ownership is a collection of rights to use and enjoy property, including the right of enjoyment, control and transmission to others. Ownership is either absolute or qualified.

**Owner:** The person or persons who own the fee and have the right to dispose of the property and the person or persons who have possessory right to land or the person occupying or cultivating it. The equitable owner or equitable joint owners (also termed the beneficial owner) and not the legal owner or nominal owner, possess the ownership for the purposes of classification and taxation.

**Producing Timber:** Land that includes trees removed through harvest, clear-cut or by natural disaster such as fire.

**Producing Noncommercial:** Forestland that meets minimum growth requirements but has been withdrawn from timber utilization through statute, ordinance, administrative order, covenant or deed restrictions.

**Natural Stands:** Fully-stocked, even-aged softwood stands that are naturally regenerated.

**Normal Stands:** Stands that are fully-stocked.

**Site:** Land that has the capacity to grow at least 15 contiguous acres of timber.

**Stemwood:** The bole or trunk of the tree, excluding the roots, branches and needles.

**Stocked or Stocking Rate:** An indication of the number of trees in a stand as compared to the desirable number for best growth and management; such as well-stocked, over-stocked, or partially-stocked. Stocking is a qualitative expression that is usually expressed as some percentage in relation to some standard.

**Stumpage Value:** The amount timber would sell for under an arm's-length transaction, made in the ordinary course of business, and expressed in dollars per unit of measure.

**Timber:** Any down or standing trees of marketable species, mature or immature, alive or dead, that is capable of furnishing raw material used in the manufacture of lumber or other forest products. The term does not include cultivated Christmas trees.

**Unproductive Noncommercial:** Forestland incapable of yielding usable wood products because of adverse site conditions, or so physically inaccessible as to be unavailable

economically now or prospectively. Forestland that is incapable of producing in excess of 25 cubic feet per acre per year of commercially usable wood.

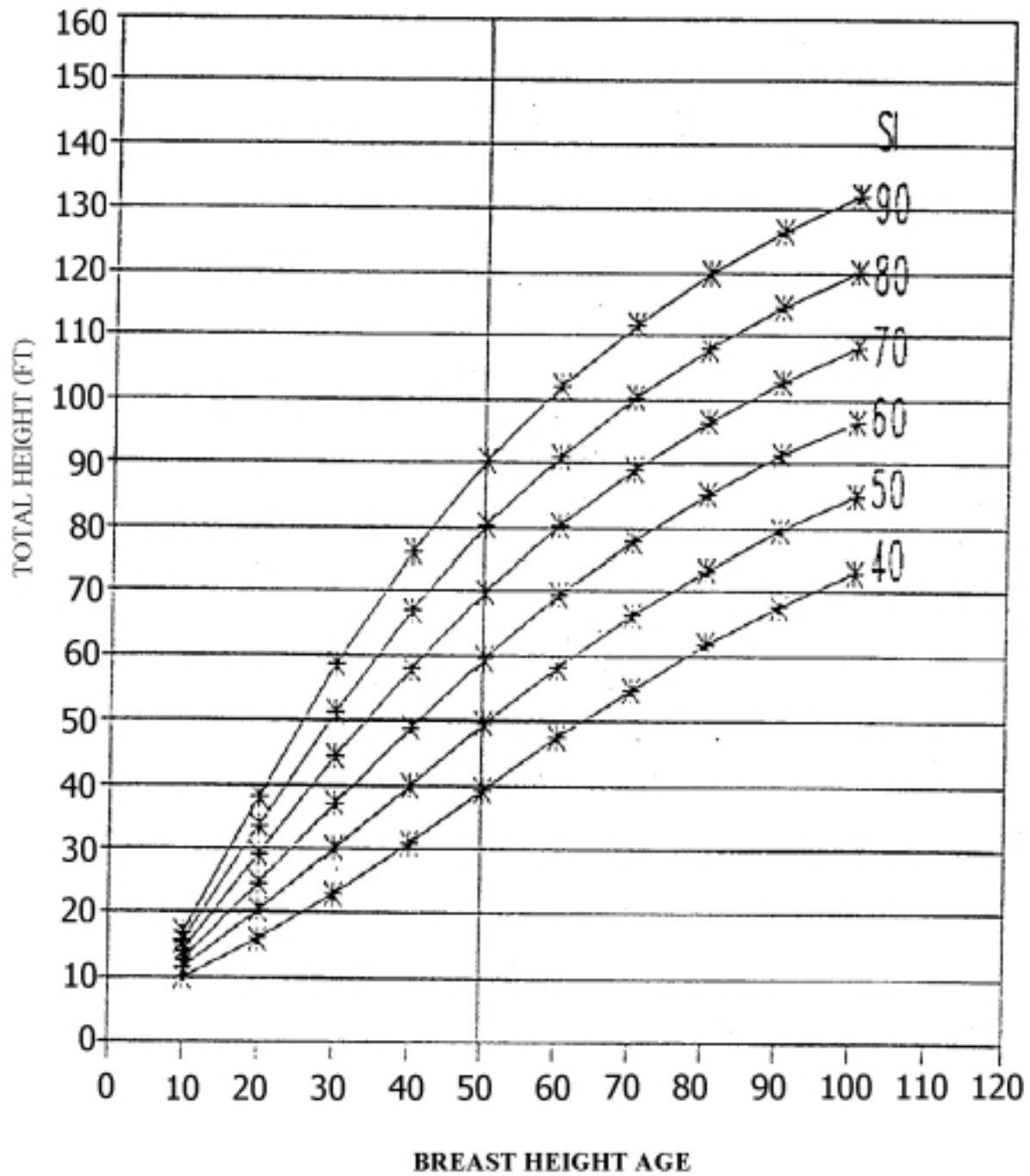
**Wild Christmas Trees:** Trees grown in a natural forest setting that are pruned or managed for marketing as Christmas trees. Wild Christmas trees are treated as class 10 property.

**Wood Products:** Any timber products severed from the stump and used in some manner for personal or commercial use. Commercial timber species must be severed from the stump to be considered consumed by man or beast.



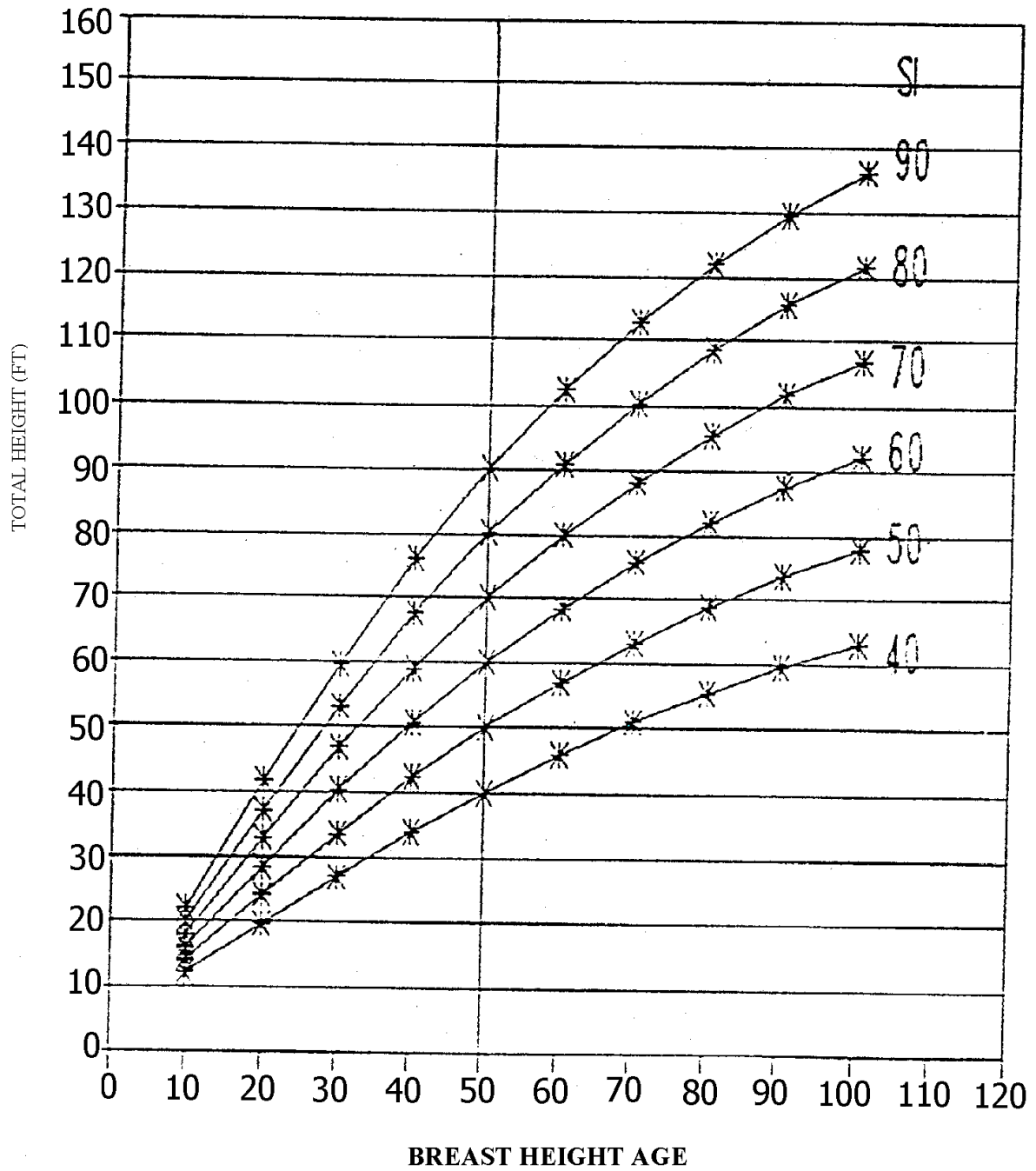
**Figure 1**

# *Height Growth Curves For Ponderosa Pine*

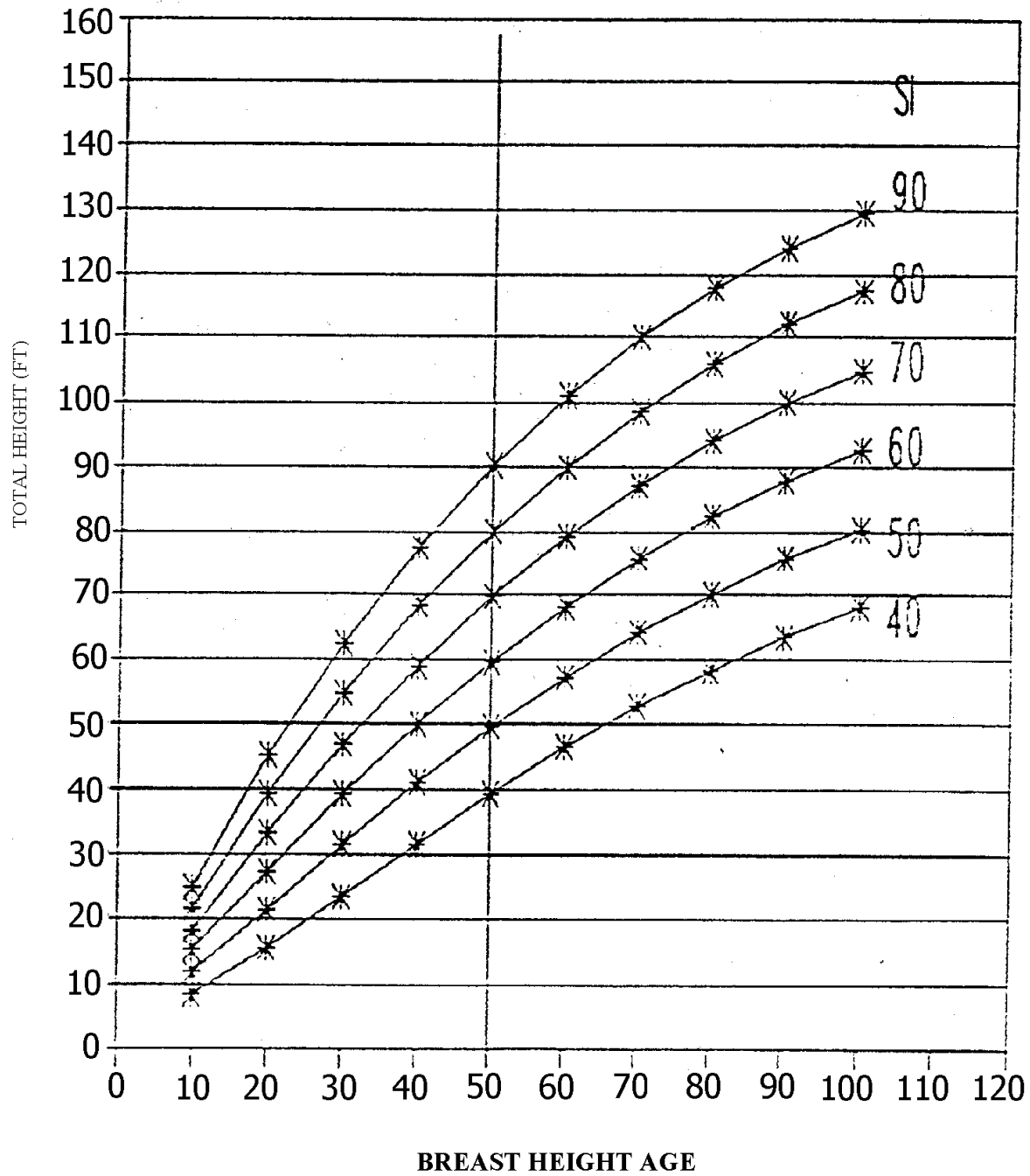




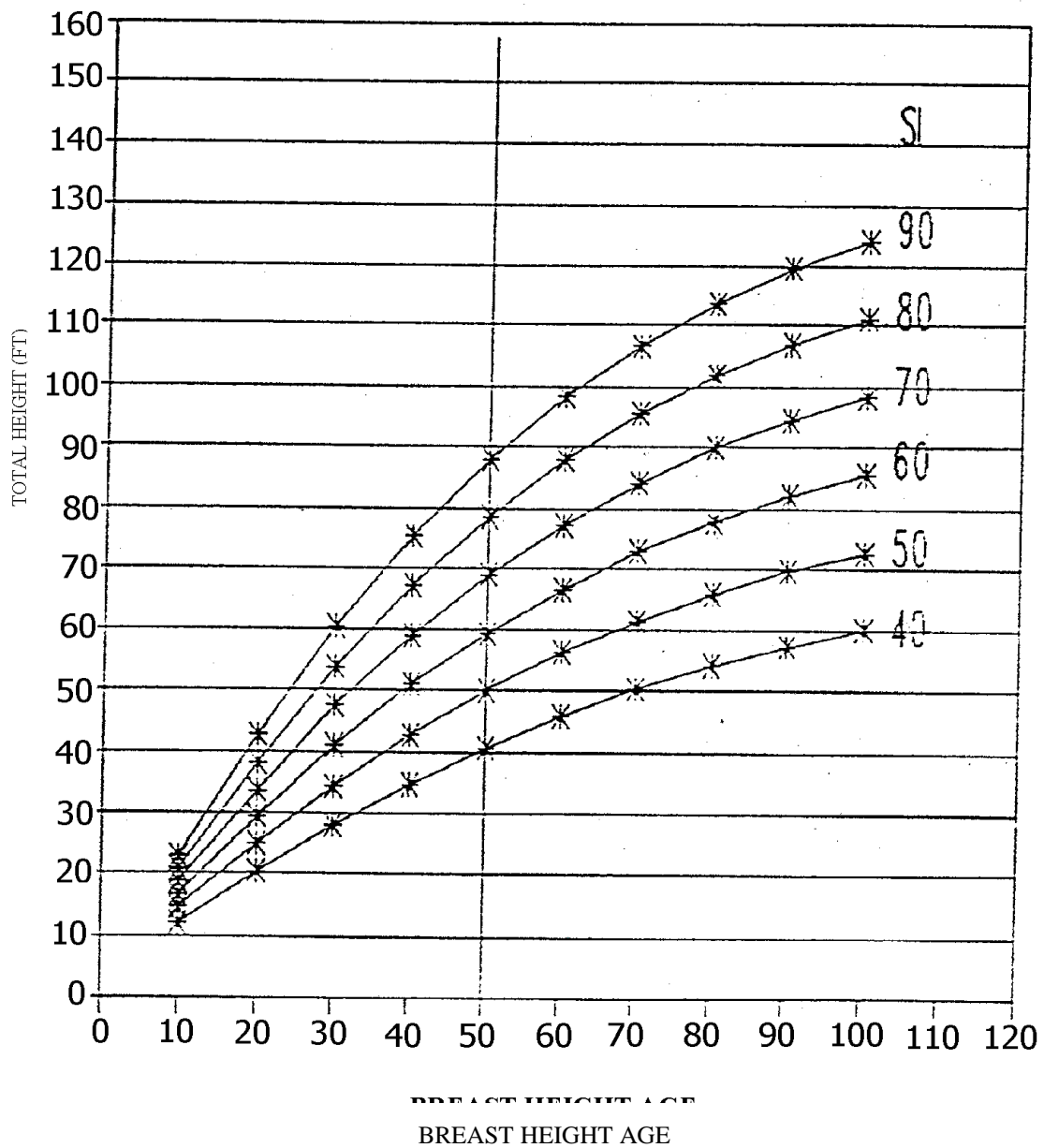
**Figure II**  
*Height Growth Curves For Douglas Fir*



**Figure III**  
*Height Growth Curves For Western Larch*



# Figure IV Height Growth Curves For Lodgepole Pine



# *Figure V*

## *Western Montana Yield Table*

Site Index	Cubic Volume @ CMAI <sup>17</sup>
44	23
45	24
46	26
47	27
48	29
49	31
50	34
51	35
52	35
53	36
54	37
55	37
56	38
57	39
58	40
59	41
60	42
61	44
62	47
63	50
64	53
65	56
66	59
67	62
68	65
69	67
70	70
71	73
72	76
73	79
74	82
75	85
76	88

<sup>17</sup> Yield figures calculated by Randy Pearson by culminating yield data found in Selected Yield Tables for Plantations and Natural Stand in Inland Northwest Forests. Stage, Albert R., David L. Renner, Roger C. Chapman. USDA Forest Service Intermountain Research Station, Res. Pap. INT-394. Nov. 1988. Pg.3.